REMARKS:

The Office Action of January 21, 2004, has been carefully considered. In response thereto, claims 5, 6 and 24 have been cancelled, new claim 25 has been added, and claims 1, 8, 12, 15, 18, 20, and 22 have been amended. Claims 1-4, 7-23 and 25 remain in this application for further prosecution on the merits.

Applicant is grateful for the indication of allowable subject matter in claims 6 and 8, and have amended claims 1 and 8 to incorporate what is believed to be the patentable subject matter identified by the Examiner.

Upon reviewing the amendments presented herein, it is noted that claim 1 now incorporates the polyolefin adhesive webs, formerly found in original claim 6. Claim 8 is now written in independent form and includes specific basis weights. Claim 12 has been amended to include poorly wetted or weakly bonded high tensile modulus fibers, formerly found in claim 13. Claims 15, 18 and 20 now further include one or both basis weights found in claim 8. Claim 22 incorporates the 300-6,000 gram/m^2 minimum basis weight for the ballistic aramid material, formerly found in claim 24. New claim 25 limits the resin of the polymeric matrix, polymer fibers, and resin of the resin-impregnated glass fabric layers to the same resin.

In the Office Action of January 21, 2004, the Examiner rejected claims 1-5 and 9-11 under 35 U.S.C. §103(a) as being unpatentable over Spielau et al. '051 in view of Palmer et al. '234. The Examiner's position from the Office Action is as follows:

> SPIELAU et al. discloses a laminate or multilayered composited structure based on epoxy resin that provides the advantages of the glass-fiber reinforced epoxy resin laminates, such as high flexural strength, surface resistance, among others. (Column 2, lines 10-17) The reference discloses that one drawback of glass-reinforced epoxy resin laminates is poor drilling and punching and cutting capacity. (Column 2, lines 10-22) The reference teaches a laminate construction constituting a bonded multilayered composite of resin-impregnated outer plies, containing a substrate of glass fibers with resin-impregnated core plies containing flat textile forms of synthetic thermoplastic fibers. (Column 2, lines 32-37. The reference teaches materials for the fibers of thermoplastic synthetic resins for the

core plies that read on the present application. (Column 3, lines 19-54) In their drawings, the reference shows the laminate of their invention. With regards to the claimed toughness, tensile modulus, elongation at break, since Spielau employs the same materials, presumably it would possess the same properties.

The reference fails to explicitly teach that the composite fiber reinforced plastic member is mechanically fastened to a substrate material to form a composite joint.

PALMER et al. discloses a woven material as a reinforcement for forming layered resin impregnated articles which are resistant to catastrophic damage from shock or local impacts as from a hard object. (Abstract) The reference teaches that the fiber reinforced resin or plastic articles have numerous applications, particularly a structural components in airplanes, ships and automobiles. (Column 1, lines 33-36) The reference addresses the problem of loss in panel strength by holes drilled in panels for attachment, e.g. of rivets, bolts, hinges, and the like. (Column 1, lines 45-49) The reference teaches that a portion of the high modulus fibers such as carbon in a high modulus high strength woven material are replaced by bands of low modulus fibers, e.g. of fiberglass or organic fibers, e.g. Kevlar, to form alternate bands or strips of high modulus fibers and adjacent alternate bands or strips of low modulus fibers. (Column 2, lines 31-36).

Since both, SPIELAU and PALMER, are directed to multilayered composite structures and are analogous art under class 428, the purpose disclosed by PALMER would have been recognized in the pertinent art of SPIELAU.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to attach the laminate of SPIELAU to a substrate and provide with a mechanical fastener to form a joint with the motivation of producing an article that is resistant to catastrophic failure or damage from shock or hard local impact as disclosed by PALMER. (Column 1, lines 6-13).

The Examiner has also rejected claims 1-2, 7, 9, 10-11 under §103(a) as unpatentable over Krause '528 in view of Palmer et al. '234. The Examiner's position is:

KRAUSE discloses a composite fiber reinforced plastic member and its method of manufacture to provide a high-strength light-weight part particularly suitable for use as a structural component. The composite member comprises a body or web comprised of a glass fiber reinforced thermosetting resin matrix having having [stet] a carbonized fiber reinforced compatible resin. (Abstract) The reference teaches the use of components fabricated from reinforced synthetic resins in the aircraft, automotive, leisure products and industrial equipment

industries. (Column 1, lines 11-14) The reference teaches that in order to increase the strength of the prior art's fiberglass reinforced plastic components, they proposed to mix higher strength fibers or filaments with the glass fibers or glass filaments effecting a further reinforcement thereof. Fibers such as carbonized fibers, boron fibers, steel fibers, asbestos fibers, and the like, have been suggested, of which highly carbonized or graphitized fibers are particularly suitable because of their exceedingly high-strength. (Column 1, lines 26-56) The reference teaches the use of layers or strata of graphite fiber reinforced layers sandwiched between two overlying glass fiber containing resin matrices to achieve the requisite reinforcement as the case may be. (Column 5, line 63 through Column 6, line 3). It is the Examiner's interpretation that this teaching equates to the laminate comprising a pair of composite layers containing a resin-impregnated glass fabric or mat and a core layer laminated between the pair of composite layers. With regards to the claimed toughness, high modulus and low modulus materials, it is noted that the Kraus reference teaches the same material and the same structure so that it would have to have the same properties. With regards to claim 7, it is noted that the reference teaches mixing higher strength fibers or filaments with the glass fibers or glass filaments effecting a further reinforcement in the reinforced plastic components. (Above)

While KRAUSE teaches that the composite fiber reinforced plastic member is used in aircraft, automotive, leisure products and industrial equipment industries. The reference fails to explicitly teach that the composite fiber reinforced plastic member is mechanically fastened to a a [stet] substrate material to form a composite joint.

PALMER et al. discloses a woven material as a reinforcement for forming layered resin impregnated articles which are resistant to catastrophic damage from shock or local impacts as from a hard object. (Abstract) The reference teaches that the fiber reinforced resin or plastic articles have numerous applications, particularly as structural components in airplanes, ships and automobiles. (Column 1, lines 33-36) The reference addresses the problem of loss in panel strength by holes drilled in panels for attachment, e.g. of rivets, bolts, hinges, and the like.

Finally, the Examiner indicated that claims 6 and 8 would be allowable if rewritten in independent form, including all of the limitations of the base claim and any intervening claims. The Examiner states that:

The prior art of record fails to teach a composite joint of the present invention in which the resin-impregnated fiber containing layers comprise a fabric with a basis weight of at least about 400 g/m^2 and the fiber-containing core layer fabric has a

basis weight of at least 200 g/m^2. Further, there is no teaching for the use of polyolefin adhesive webs for assisting in lamination.

Applicant has now amended claim 1 to incorporate the polyolefin adhesive webs formally found in claim 6, and has rewritten claim 8 in independent form to include the basis weight limitations, but not the recyclability features of claim 7.

In addition, Applicant has included at least one basis weight limitation in independent claims 15, 18 and 20. Since there are no basis weight limitations found in Spielau et al. '051, Palmer et al. '234, nor Krause '527, which anticipate or render obvious these claims, claims 1-4, 7-11 and 15-21 appear allowable over the prior art of record.

In addition, claims 12-14 all include the limitation that the core layer contains poorly wetted or weakly bonded high tensile modulus fiber, roving, yarn, woven fabric, nonwoven fabric, or a combination thereof. This feature allows the core layer of the laminate of claims 12-13 to absorb more energy and provide greater toughness. Applicant can find no teaching or suggestion in Spielau et al. '051, Palmer et al. '234 or Krause '528 for providing this feature and believes that claims 12-14 should be allowable.

Claims 22 and 23 now require a ballistic and explosion-resistant panel which includes an aramid fiber-containing core layer having a basis weight of at least 300-600 g/m^2, which is also not taught or suggested in the cited references. Accordingly, reconsideration of claims 22 and 23 is requested.

New claim 25 has been added to provide more detail to the recyclability limitations found in claim 7. Claim 25 is directed to a multi-layered composite having improved energy absorbing properties, which include a pair of resin-impregnated, glass fabric layers, and a core layer for

absorbing energy directed to the composite by externally applied forces. The core layer includes polymer fibers within a polymeric matrix, in which the polymer fibers, the polymeric matrix and the resin of the resin-impregnated glass fabric layers comprise the same resin. This permits the components of this composite to be readily recycled, since there is only a single resin type and a single fiber type to be separated. Since there is no teaching or suggestion in any of the cited references for providing only two materials in a multi-layered energy absorbing composite to, for example, permit easier recycling, claim 25 also appears to be patentable.

In view of the above, reconsideration of this application is respectfully requested and an early notice of allowance is earnestly solicited.

The Commissioner is hereby authorized to charge any additional fees or credit any excess payment which may be associated with this communication to Duane Morris LLP Deposit Account 04-1670.

Respectfully submitted,

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